

PROJECT facts

U.S. DEPARTMENT OF ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Transportation Fuels
and Chemicals

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PRODUCTION AND DEMONSTRATION OF SYNTHESIS GAS-DERIVED FUELS

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Description

This project will demonstrate the effective production, testing, adaptation and use of ultraclean, domestically produced fuels that can be delivered by existing fuel infrastructures. Furthermore, this project will attempt to show the economic advantage of moving a small plant to a variety of currently stranded fossil fuel feedstocks. Many fossil fuels are located in hard to access places, which make these resources uneconomical as feedstocks. Other sources such as coal fines, refinery wastes, and landfill gases are generally economic burdens and environmental hazards that are currently unusable as energy resources. The ability to move a Small Footprint Plant (SFP) into these locations will result in these currently useless resources being converted to high-cetane, ultraclean fuels, with non-detectable sulfur and aromatic levels, for both production engines and advanced engine technologies.



Small Footprint Plant



Synthesis Gas-Derived Fuel

These hydrogen saturated synthetic fuels have been shown in stationary vehicular engine tests to reduce harmful emissions by substantial amounts. However, longer term tests are needed to demonstrate the fuel's practicality in commercial settings. This project includes: over-the-road commercial bus tests in Washington, DC and Alaska; cold-starting and cold-operation testing; evaluations of after-treatment systems; use of exhaust gas re-circulation (EGR); and varied injection timing. More extensive testing is particularly relevant for evaluating emissions reduction, drive-train efficiency, fuel blends and additives.



LEAD INDUSTRY PARTNER

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COST SHARING

DOE	\$18 million
Non-DOE	\$20 million

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Fuel test data and cost data, derived in part from construction and operation of the Syntroleum SFP, will be used to develop a well-to-wheels economic analysis. The economic analysis will include likely market thresholds for an eventual substitution of synthesis gas-derived ultraclean fuels for conventional fuels. While already attractive from an environmental perspective, these ultraclean fuels are also anticipated to become more economically competitive. Conventional fuels are increasingly derived from costly "sour" crude, and U.S. needs are projected to rise as a result of increased heavy vehicle use. Because this "sour" crude is higher in sulfur content it is more costly to refine, and the market price of fuels derived from it is expected to continue to climb.

In addition to studying the fuels for transportation purposes, this project will determine the feasibility of using the SFP fuels in conventional and advanced stationary power plants suitable for rural Alaska. Specifically, both diesel gen-sets and reformer fuel cells will be tested.

The production process and fuel being demonstrated by this project could also have a number of advantages for military applications, including the ability to produce fuel closer to the location of conflicts than was possible in the past. One of the primary advantages of this concept for military applications is the ability to produce ultraclean fuel from a variety of domestic and foreign resources.

To perform this project, Integrated Concepts and Research Corporation (ICRC) has assembled a team composed of Syntroleum Corporation and Marathon Oil Company—two major petroleum companies; Daimler-Chrysler Corporation and Volkswagen of America—two major vehicle and engine manufacturers; West Virginia University; Massachusetts Institute of Technology, Sloan Automotive Laboratory; the University of Alaska at Fairbanks; and A.D. Little, Inc.—a technology market research firm. The team will test fleet vehicles from Denali National Park and Washington Metropolitan Area Transit Authority.



Artist's concept of commercial bus used for fleet test